

**Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal Form**

Section 1. General administrative information

**Annual Coded Wire Tag Program (Washington)-
Missing Production Groups**

Bonneville project number, if an ongoing project 8906600

Business name of agency, institution or organization requesting funding

Washington Department of Fish and Wildlife

Business acronym (if appropriate) WDFW

Proposal contact person or principal investigator:

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Subcontractors. List one subcontractor per row; to add more rows, press Alt-Insert from within this table

Organization	Mailing Address	City, ST Zip	Contact Name

NPPC Program Measure Number(s) which this project addresses.

7.2 D.4

NMFS Biological Opinion Number(s) which this project addresses.

ND--NMFS- BO- Basic Monitoring

Other planning document references.

If the project type is "Watershed" (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.

Subbasin.

Short description.

Apply coded-wire tags to at least one production group of each species of salmon at each Mitchell Act funded WDFW hatchery in the Columbia Basin that are not currently tagged by another funding source.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production		Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate	X	Monitoring/eval.	X	Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Stock identification, survival and contribution of hatchery salmon

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
8906500	Annual Coded Wire Tag Program	USFWS
8906900	Annual Coded Wire Tag Program	ODFW

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2, 3	Objective	Task a,b,c	Task
1	Tag and release at least one group of smolts from each	a	coordinate tagging with all appropriate entities

	hatchery		
		b	Apply coded wire tags into snouts and remove adipose fin of 2.345 million salmon
2	Recover and decode tags and estimate survival of tagged groups	a	Collect snouts from adult returns to hatcheries
		b	Recover tags and decode
		c	Estimate survival and contribution
		d	Analyze results and recommend improvements
3	Develop preliminary catch and distribution data for all Columbia River Hatcheries	a	Retrieve coded-wire tag data from PSMFC data base
		b	Analyze catch and survival data and provide written narrative
		c	Report results at Technical or Project Review conferences

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	09/1999	67
2	10/1998	09/1999	22
3	10/1998	09/1999	11

Schedule constraints.

Completion date.

2010

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	Salaries with 3 % COLA	\$31,248
Fringe benefits	Health, L&I, OASI etc.	\$7,677
Supplies, materials, non-expendable property	CWT	\$269,675
Operations & maintenance		0

Capital acquisitions or improvements (e.g. land, buildings, major equip.)		0
PIT tags	# of tags:	0
Travel		\$900
Indirect costs		\$49,237
Subcontracts		0
Other		0
TOTAL		\$358,736

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	383,848	410,717	439,467	470,230
O&M as % of total	0	0	0	0

Section 6. Abstract

The goal of the program is to tag a statistically valid number of individual fish of each species from each hatchery such that accurate estimates of survival, contribution and stray rates can be made, and allow comparison between groups of fish released from each hatchery. For multiple group comparison the release numbers have been determined to have sufficient power such that the probability of detecting at a 50% difference in survival between groups is $p=1-0.95/2$.

The expected outcome of this project is a long time series of survival data as well as sufficient tag recoveries of strays to comply with guidelines of hatchery production outlined in the Snake River and other to be developed recovery plans. This information is particularly important to meeting the goals of the Fish and Wildlife Program and will provide data for other scientific analysis to be done at later dates.

A long, continuous time series of data on survival, contribution, and straying of hatchery salmon currently does not exist for Columbia River hatcheries. Time series data is essential to understanding trends in salmonid abundance caused by environmental and other factors as well as analyzing the effectiveness of hatcheries in meeting production goals in a cost effective manner and determine the ecological effects of hatchery fish on wild fish. .

Section 7. Project description

a. Technical and/or scientific background.

The creation of the Annual Coded-Wire Tag Program, Missing Production Groups for Washington, Oregon and the USFWS allows fishery agencies to assess survival of hatchery fish reared at different locations or with different rearing practices.

The information provided by this project will lead to improvements in hatchery practices, and allow hatcheries to comply with the NMFS Snake River Recovery Plan provision for basic monitoring of hatchery production. Compliance is accomplished primarily by providing a wide coverage of recognizable marked fish along the Columbia Basin that allows for identification and estimation of strays into watersheds with listed species. With new listings announced and future recovery plans that will specify increased precision of stray rates, the continuation of the project is essential to WDFW meeting compliance for hatchery production in the Columbia Basin. Furthermore, continued development of a long, time series of data, can be used for a multitude of resource assessments affecting Columbia Basin operations. This project does not actively mitigate for losses.

The Fish and Wildlife Program (2/11/87) Measure 206 (b)(1)(B) created areas of emphasis where BPA was to focus its funding of salmon and steelhead research over a five year period including exploring methods for substantially increasing and improving hatchery production at existing hatcheries within a ten year period. As defined in Measure 703(e) (1) a plan drafted by the created TWG included projects to address specific needs in improving hatchery effectiveness. The establishment of a long time series of data are essential for making wise use decisions of how to integrate hatcheries into meeting of mitigation requirements, court ordered actions, agency mandates, and for incorporating hatcheries into recovery programs. For example, several researchers (Pascual and Quinn 1994) have used previous data bases to ascertain stray levels of chinook salmon and quantify differences in homing by release site and age at maturity. These types of analyses are essential to meeting requirements under various species recovery plans in the Columbia Basin, and provides the knowledge necessary to manage hatcheries in manners ecologically consistent with wild fish recovery efforts.

The project history follows:

1990 tagged 1,434,101 chinook and coho.

1991 tagged 1,377,166 chinook and coho.

1992 tagged 1,299,245 chinook and coho.

1993 tagged 2,473,946 chinook and coho and decoded 3,148 tags from returning salmon.

1994 tagged 1,949,381 salmon and decoded 3,794 tags from returning adults.

1995 tagged 1,855,939 chinook and coho and decoded 2,673 tags from returning adults.

1996 tagged 1,798,528 chinook and coho and decoded 1,266 tags from returning adults.

During this time period annual reports presented the results of the tagging operations and beginning in 1993 presented summaries of survival and contribution data (Fuss et al. 1994).

References: Fuss, H.J. R. Fuller, M.A. Kimbel, A.E. Appleby, and S. A. Hammer. Annual coded-wire tag program. Annual coded wire tag program (Washington) missing production groups. Annual Report 1993, Bonneville Power Administration. Project # 8906600. 81 p.

Fuss, H.J. 1995. Annual coded wire tag program (Washington) missing production groups. Annual Report 1994, Bonneville Power Administration. Project # 8906600. 95 p.

Byrne, J., and H.F. Fuss, C.A. Ashbrook. 1996. Annual coded wire tag program (Washington) missing production groups. Annual Report 1995, Bonneville Power Administration. Project # 8906600. 103 p.

b. Proposal objectives.

Objective 1: Tag at least one production group of each species at each Mitchell Act funded Columbia Basin Hatchery operated by the Washington Department of Fish and Wildlife that is currently not tagged by another funding source.

Objective 2: Recover snouts from each hatchery or spawning ground and decode these tags to provide information to the PSMFC. Estimate survival and contribution data for each group released.

Objective 3: Develop catch and distribution data for all WDFW Columbia River hatcheries using the 1986-89 brood chinook and 1988-89 brood coho. Compile and analyze all subsequent broods' survival and contribution data tagged under this contract.

Measurable goals: Production groups of chinook and coho at each of nine WDFW Mitchell Act hatcheries are tagged to determine survival, contribution and stray rate data. This amounts to over 2 million tagged smolts per year. Recover snouts and decode CWT's from recoveries at each hatchery. This averages about 2,200 fish per year. Analyze data from over 250 tag codes. Compile and analyze the results from these tagged releases.

c. Rationale and significance to Regional Programs.

Tagging representative groups of chinook and coho salmon are essential to meeting several important measures of the Fish and Wildlife Program including: 7.0D Comprehensive Environmental Analysis of Federal Production Activities. 7.1A Evaluation of Carrying Capacity. 7.1C Collection of Population Status, Life History, and Other Data on Wild and Naturally Spawning Populations. 7.1F System wide Cumulative Impacts of Existing and Proposed Artificial Production Projects. It is also essential in meeting compliance with the Snake River Recovery Plan (Basic Monitoring) and without continuance of the scope of this long term data series, managers will not have the ability to assess the efficacy of hatchery production or recovery programs.

The coded wire tag is a tool that is used for stock identification, as well as a host of other purposes such as harvest management, hatchery evaluations, production monitoring, rearing conditions, effectiveness of disease treatments, type of release, and distribution in time and area.

Other relevant projects in the Columbia Basin include the Oregon and USFWS portion of the contract as well as several monitoring and evaluation projects (e.g; 8910800, 8903000, 8816300, 9207300, 9506300, 9603302, 9604000, 8812001).

d. Project history

Project history for 8906600 Annual Coded Wire Tag Program (Washington)-Missing Production Groups. The total length of the project is 8 years.

History:

1990 tagged 1,434,101 chinook and coho.

1991 tagged 1,377,166 chinook and coho.

1992 tagged 1,299,245 chinook and coho.

1993 tagged 2,473,946 chinook and coho and decoded 3,148 tags from returning salmon.

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During this time period annual reports presented the results of the tagging operations and beginning in 1993 presented summaries of survival and contribution data (Fuss et al. 1994).

Project reports: Quarterly reports for FY 90, 91, 92, 93, 94, 95, 96, and 97.
Annual Reports for FY-90, 91, 92, 93, 94, 95, 96.

Presentations: BPA project review: 1992, 1996

Summary of major results: We have tagged over 12 million chinook and coho since the project began. On average over 1.5 million fall chinook, 0.5 million spring chinook, and 0.4 million coho are tagged. Some of the coho groups are used to assess survival of introduction of coho to the Klickitat River and other mid-Columbia tag groups.

ON average we decode the snouts of over 2,000 returning adults per year. We have been able to assess survival, contribution, and stray rates since 1993. We have found that survival of coho has declined over the past three broods, fall chinook survivals have stayed fairly constant as have spring chinook survivals. Tagging of fall chinook at Klickitat Hatchery has indicated stray rates of Lyons Ferry origin fall chinook back to the donor hatchery.

Past Costs by Fiscal Year: **1990:** \$148,468 **1991:** \$165,396 **1992:** \$207,972
1993: \$314,185 **1994:** \$345,000 **1995:** \$250,000 **1996:** \$198,063 **1997:** \$302,517
1998: \$335,000

e. Methods.

The basic premise of the proposal is to apply coded wire tags into snouts and remove at least 75% of the adipose fin of smolts in species numbers and locations annually approved by the Bonneville Power Administration. All procedures shall conform to those set forth in "A Manual of Procedures for Coded Wire Tagging of Pacific Salmonids, 1989" or most recent edition (Pacific Fisheries Management Council). When multiple groups are marked at a given location, sufficient tagged fish are released in each group so that the probability of detecting a 50% difference between groups is at least $P = 1 - 0.95/2$. Tag numbers are further determined to provide at least 30 recoveries of fish to each fishery or escapement location. A summary of methods follows: recent survival data is analyzed to determine if tag numbers meet the criteria above. Production at each hatchery is reviewed and new or discontinued production groups identified and proposed for inclusion. Sufficient numbers of fish of each species are randomly collected from the hatchery, tagged and placed back into production ponds and later released. Every individual adult returning to the hatcheries is screened for the presence of an adipose fin, and those fish lacking adipose fins have the snout removed, the pin removed from the snout and decoded. Data from collection of snouts, along with sampling rates, is sent to the PSMFC for inclusion in the coast-wide data base. These data records are queried

every year and survival and contribution data calculated. Survival is the percentage of estimated recoveries divided by the number of tagged fish released, and contribution data is the number of recoveries in each fishery or escapement cell divided by the total number of recoveries or by the number of tags released.

The critical assumptions for this project are: 1) tagged fish represent untagged fish, 2) probability of recovery of tagged fish are not contingent on hatchery location. The results expected are computation of survival and contribution rates to exceed zero percent, detection and recovery of tagged fish in all sampled fisheries and escapement locations.

The scope of the project includes nine WDFW Columbia Basin Hatcheries and recovery locations from California to Alaska for fisheries, and the states of California, Oregon, Idaho, and Washington for recovery of escapement data. One or more groups of fall chinook, spring chinook, and coho are tagged at each of the nine facilities each year, representing about 20-30 tag codes per year. Multiple tag groups of a single species at a given hatchery are determined by differences in rearing methodology, for example if a two releases of fall chinook occur more than two weeks apart.

Factors limiting success are primarily related to unfavorable environmental conditions that would limit survival. Also, the possibility of loss of funding for sampling of fisheries, or maintenance of the PSMFC data base in Portland, Oregon, would severely limit the effectiveness of this project.

f. Facilities and equipment.

No equipment required.

g. References.

- 1) Byrne, J., and H.F. Fuss, C.A. Ashbrook. 1996. Annual coded wire tag program (Washington) missing production groups. Annual Report 1995. DE-BI79-89BP01873, Bonneville Power Administration, Portland, Oregon.
- 2) Fuss, H.J. R. Fuller, M.A. Kimbel, A.E. Appleby, and S. A. Hammer. Annual coded-wire tag program. Annual coded wire tag program (Washington) missing production groups. Annual Report 1993, DE-BI79-89BP01873, Bonneville Power Administration. Portland, Oregon.
- 3) Fuss, H.J. 1995. Annual coded wire tag program (Washington) missing production groups. Annual Report 1994, Bonneville Power Administration, DE-BI79-89BP01873, Portland, Oregon.
- 4) Pascual, M.A. and T. P. Quinn. 1994. Geographical patterns of straying of fall chinook salmon from Columbia River Hatcheries. Aquaculture and Fisheries Management, 25: Supplement 2, 17-30.

Section 8. Relationships to other projects

This project is one of three that covers hatchery operations in the Columbia Basin. The USFWS and ODFW have similar projects, and coupled with this project provide a very detailed account of survival, contribution, and stray rate trends of hatchery reared salmon. These data provide a reliable audit of hatchery effectiveness, help meet compliance under ESA limitations of hatchery use, and provide other researchers a very large data base to use to determine other functional relationships of salmon survival and distribution.

Section 9. Key personnel

Howard J. Fuss--Principal Investigator, 0.5 FTE's (6 months)

Duties Coordinate with contract officer (BPA) funding levels, annual and quarterly report formats and due dates. Coordinate with hatchery and tagging personnel the level of tagging, the species and number of production groups to be tagged, the date and location of the tagging. Coordinate tagging operations and production with the Columbia Basin Fish and Wildlife Authority. Coordinate and direct hatchery mark sampling routines, collection and delivery of snouts for retrieval and decoding of tags. Coordinate dispersal of data to PSMFC, and retrieval and compilation/summary of data. Analyse data to determine if current tagging levels are adequate, if adequate coverage of production groups is occurring, and collate data into, and provide written analysis for, annual reports published by the Bonneville Power Administration. Supervise additional biological staff in achieving these duties.

Qualifications: Master of Science Degree, Employed by WDFW Hatcheries Program for 17.8 years.

Resume

Principal Investigator: Howard J. Fuss

Age: 44

Status: Married, no children

Occupation: Research Scientist 1

Employer: Washington Department of Fish and Wildlife

Length of Employment: 17.8 years

Education :

Graduated Bellevue High School, 1972.

Graduated University of Washington; BS, Fisheries Science, 1979.

Graduated University of Washington; MS, Fisheries Science, 1982.

Work History:

1980-1983: Fisheries Biologist 2 Washington Department of Fisheries, Salmon Culture Division

1984-1994: Fisheries Biologist 3, Washington Department of Fisheries, Salmon Culture Division

1995-1997: Fish and Wildlife Biologist 4, Washington Department of Fish and Wildlife, Hatcheries Program

1997-Present: Fisheries Research Scientist 1, Washington Department of Fish and Wildlife, Hatcheries Program

Current Duties: Fisheries Research Scientist in the Hatcheries Program of the Washington Department of Fish and Wildlife. I design, conduct and implement extensive research on hatchery practices, ecological effects of hatchery reared fish on natural populations, and analyze data on a multitude of hatchery related issues including evaluation of ESA related projects. I supervise two fish biologists who work on these projects. We are also developing performance standards for hatchery operations on the Columbia River, Puget Sound and Coastal regions, and produced the document "Operations Plans for Washington Department of Fisheries Anadromous Fish Production Facilities". For the past six years I have been the project leader for the BPA funded project "Annual Coded Wire Tag Program- Missing Production Groups." I have used the coded wire tag data base extensively for the past 17.8 years.

Jim Byrne👉 Fish and Wildlife Biologist 2

Current Duties: Query PSMFC data base in Portland , Oregon and download data from tag codes used in BPA Project. Collate and summarize data by brood, release, and species, and partition into individual fishery or escapement cells. Generate graphs and summary tables. Coordinate with Hatchery Program and Fish Management Program regarding the number of fish tagged of each species at each hatchery.

Section 10. Information/technology transfer

Annual reports with completed brood survival and distribution data are produced each year along with semi-annual reports of objective completion. Results are used by the Integrated Hatchery Operations Team auditors, are presented at technical workshops and conferences, at BPA project reviews. The PSMFC stores all data generated by this and related projects which is accessible by any user with an account.